Preparation of Immunosensor Based on the SiO₂- Au composite for Lung Cancer-Associated Antigen Determination

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doi: 10.20964/2016.12.22

Received: 26 August 2016 / Accepted: 28 September 2016 / Published: 10 November 2016

A sensitive immunosensor with gold nanoprobe for the detection of carcinoembryonic antigen (CEA) was synthesized. The immunosensor was prepared by the covalent immobilization of antibodies on Au NPs-PDA-silica/GCE which was firstly prepared by in situ deposition of Au nanoparticles on the polydopamine functionalized silica nanosphere (PDA-silica) modified GCE. Cyclic voltammetry (CV) was employed for investigating the performances of the constructed immunosensor. The immunosensors demonstrated remarkable performance for the detection of clinical lung cancer with high sensitivity of 1080 nA/ng/ml, linear correlation within the concentration ranging from 0.2 to 120.0 ng/ml and low detection limit (S/N=3) of 0.07 ng/ml. The proposed immunosensor can be successfully applied in the determination of CEA concentration through one-step immunoassay, which was significant for the diagnosis of clinical lung cancer.

Keywords: Lung cancer; Immunosensor; Carcinoembryonic antigen; Gold nanoparticles; Polydopamine

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